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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

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| INVENTOR(S) | | | | | |
|--|--|------------------------|--|---|--|
| Given Name (first and middle [if any]) | | Family Name or Surname | | Residence (City and either State or Foreign Country) | |
| Arnold | | Kravitz | | Hollis, NH | |
| Additional inventors are being named on the <u>0</u> separately numbered sheets attached hereto | | | | | |
| TITLE OF THE INVENTION (500 characters max) | | | | | |
| METHOD AND SYSTEM FOR PROVIDING A COVERT WARNING NOTIFICATION OF A HAZARD TO AN AIRCRAFT | | | | | |
| Direct all correspondence to: CORRESPONDENCE ADDRESS | | | | | |
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| <input checked="" type="checkbox"/> Specification Number of Pages <u>6</u> | | | | | |
| <input type="checkbox"/> CD(s), Number _____ | | | | | |
| <input checked="" type="checkbox"/> Drawing(s) Number of Sheets <u>3</u> | | | | | |
| <input type="checkbox"/> Other (specify) _____ | | | | | |
| <input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76 | | | | | |
| METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT | | | | | |
| <input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. | | | | | |
| <input type="checkbox"/> A check or money order is enclosed to cover the filing fees. | | | | | |
| <input checked="" type="checkbox"/> The Director is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: <u>190130</u> | | | | | |
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| FILING FEE Amount (\$) <u>160.00</u> | | | | | |
| The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government. | | | | | |
| <input type="checkbox"/> No. | | | | | |
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[Page 1 of 2]

Respectfully submitted,

SIGNATURE

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Date

6/3/04REGISTRATION NO. 29,404

(if appropriate)

Docket Number: 20040002 PRO**USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT**

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: KRAVITZ, Arnold


Filed: Herein

Atty. Dkt. No: 20040002 PRO

For: METHOD AND SYSTEM FOR PROVIDING A COVERT WARNING NOTIFICATION
OF A HAZARD TO AN AIRCRAFT

CERTIFICATE OF MAILING 37 CFR 1.10: I certify that this correspondence is being deposited on the below date with the U.S. Postal Service with sufficient postage as EXPRESS MAIL addressed to: Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450.

Date: 6-3-04


Gloria Abbasciano

Dear Honorable Commissioner:

LETTER OF TRANSMITTAL

Submitted herewith is a Provisional Patent Application consisting of 1 pages of cover sheet, 6 pages of specification and claims, 3 sheets of drawings.

[] Invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

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Respectfully submitted,



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METHOD AND SYSTEM FOR PROVIDING A COVERT WARNING
NOTIFICATION OF A HAZARD TO AN AIRCRAFT

Background of the Invention

1. Field of the Invention.

The present invention relates to air traffic control and more particularly to methods and systems for air traffic control that provide cover warnings or notification of hazards to aircraft.

2. Brief Description of Prior Developments.

Recently there has been an increased interest in protecting commercial aircraft from attacks carried out by terrorists by means of a class of shoulder fired ground to air missile systems known as a Man Portable Air Defense System (MANPADS). It is believed that the vulnerability of commercial aircraft to such systems may be greatest when such aircraft are at relatively lower altitudes below 10,000 feet, which most often occurs only during take off and landing situations. In such take off and landing situations, it would be desirable to notify air traffic controllers that a MANPADS weapon has been fired at a particular aircraft. It would also be desirable that this notification be covert so as to avoid panic and prevent terrorists from testing any countermeasure system for blind spots by triggering false alarms and monitoring communication channels for data.

A need, therefore, exists for a method and system for providing a covert warning or notification to an air traffic controller of the firing of a MANPADS weapon or other emergency situation on an incoming or outgoing aircraft. A need also exists

for providing such notification without modifying any of the existing air traffic control systems, hardware or software.

Summary of Invention

The present invention is a method for providing an air traffic control (ATC) radar with a covert notification of a hazard to on aircraft equipped with an Identification Friend or Foe (IFF). This method comprises the steps of first causing the ATC radar to display radar returns that correlate with the IFF system of the aircraft with a first type of appearance. The ATC radar is then caused to display radar returns that do not correlate with the IFF system of the aircraft with a second type of appearance and the existence of the hazard to the aircraft is then identified by means of the radar return having said second type of appearance.

Brief Description of the Drawings

The present invention is further described with reference to the accompanying drawings wherein:

Fig. 1 is a schematic block diagram illustrating an embodiment of the method and system of the present invention;

Fig. 2 is a functional block diagram further illustrating the method and system shown in Fig. 1; and

Fig. 3 is a system block diagram further illustrating the method and system shown in Fig. 1.

Detailed Description of the Preferred Embodiment

Referring to the drawings, in the method and system of the present invention, the air traffic control radar displays radar returns that correlate with an aircraft's Identification Friend or Foe System (IFF). Radar returns that are not correlated with an IFF are displayed as unidentified. A unique pattern of unidentified aircraft surrounding a identified aircraft will serve as the method of identifying where and when a event has occurred on an aircraft. A radio frequency device is used to capture and re-broadcast the air traffic controller's radar waveform. By re-broadcasting the waveform one, two or n pulse rate intervals early (or late) relative to the arrival of the next air traffic control radar's waveform; false targets are created left cross range or right cross range of the aircraft. A fast time convolver is used on the rebroadcast signal to achieve down range or up range displacement of false targets. This technique will be used to create a pattern around the aircraft. Different patterns will be used to provide different emergency notifications to the air traffic controller such as Hijacking, or notification from a threat warning system that a MANPADS weapon has been launched at it.

It will be appreciated by those skilled in the art that the method and system of the present invention provides a way for commercially air traffic controllers when a MANPADS weapon has been launched at our aircraft during takeoff or landing while keeping this notification correct. That is, the dot pattern would appear on the radar display as a set of valid objects. No modification to the radar's hardware or software would be required. The only cost to implement the system would b the device, its installation on the aircraft, and the training of the air traffic controllers to understand what the pattern means.

It will also be appreciated that with the method and system of this invention, it is possible to exploit fast time convolution, and side lobe insertion to form a box of uncorrelated returns around the correlated aircraft icon on an unmodified Air Traffic Control (ATC) radar. ATC radars display returns can be correlated with mode-s transponders as aircraft. An unrelated return would appear as an Unidentified Flying Object (UFO). Fast time convolution of a stored ATC radar pulse can be re-broadcast on the next pulse rate interval to create a false return leading a trailing and aircraft. Delay and early broadcast can produce a false return next to the aircraft. The controllers would then need to be trained to interpret this pattern as a missile strike emergency (similar to a code 7700).

It will also be understood that engagement notification rules may be established so that the systems reports only observably defeated threats; reports only after the last threat is defeated; and reports via existing means to the ATC directly.

While the present invention has been described in connection with the preferred embodiments of the various figures, it is to be understood that other similar embodiments may be used or modifications and additions may be made to the described embodiment for performing the same function of the present invention without deviating therefrom. Therefore, the present invention should not be limited to any single embodiment, but rather construed in breadth and scope in accordance with the recitation of the appended claims.

Claims

What is claimed is:

1. A method for providing an air traffic control (ATC) radar with a covert notification of a hazard to on aircraft equipped with an Identification Friend or Foe (IFF) comprising the steps of:

causing the ATC radar to display radar returns that correlate with the IFF system of the aircraft with a first type of appearance;

causing the ATC radar to display radar returns that do not correlate with the IFF system of the aircraft with a second type of appearance; and

identifying an existence of the hazard to the aircraft by means of the radar return having said second type of appearance.
2. The method of claim 1 wherein at least some of the radar returns that do not correlate with the IFF system of the aircraft are identified as an Unidentified Flying Object (UFO).
3. The method of claim 2 wherein the second type of appearance is a pattern surrounding the aircraft on the ATC radar.
4. The method of claim 1 wherein at least some of the radar returns that do not correlate with the IFF system of the aircraft are Man Portable Air Defense System (MANPADS) weapons.

Abstract

The present invention is a method for providing an air traffic control (ATC) radar with a covert notification of a hazard to on aircraft equipped with an Identification Friend or Foe (IFF). This method comprises the steps of first causing the ATC radar to display radar returns that correlate with the IFF system of the aircraft with a first type of appearance. The ATC radar is then caused to display radar returns that do not correlate with the IFF system of the aircraft with a second type of appearance and the existence of the hazard to the aircraft is then identified by means of the radar return having said second type of appearance.

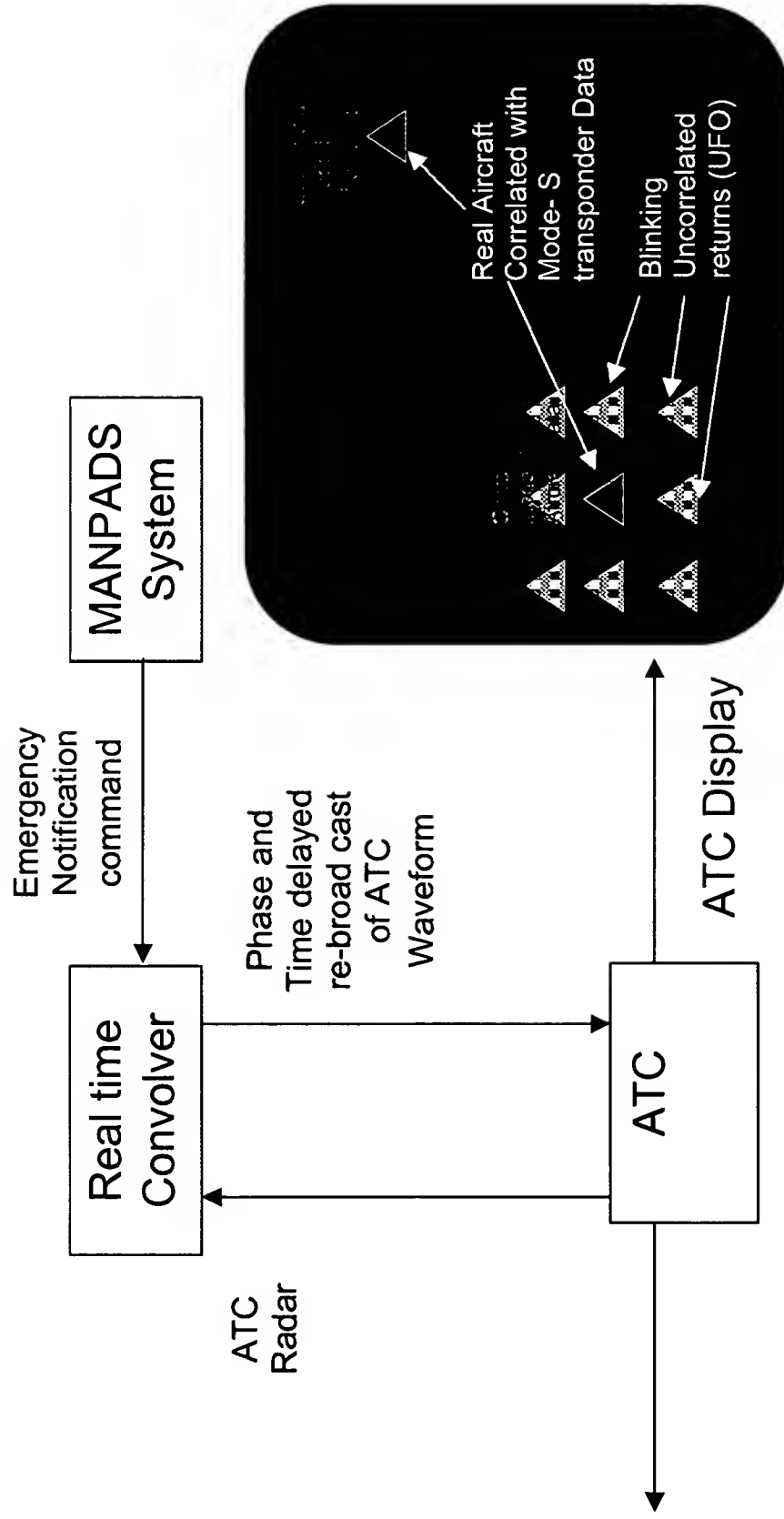


FIG. 1

Functional Block Diagram

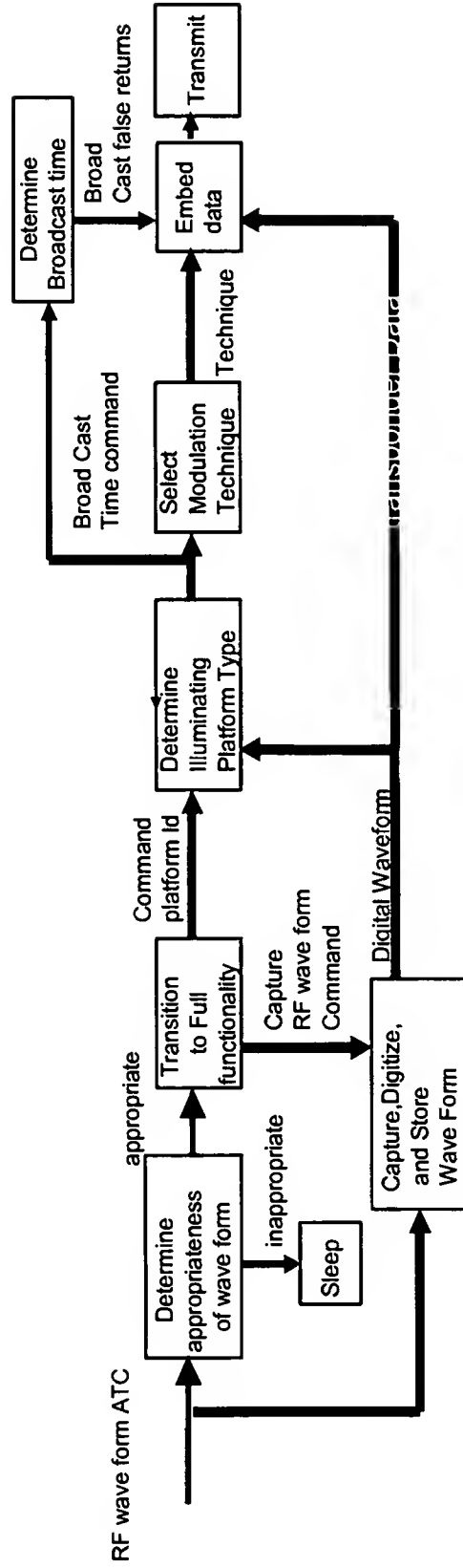


FIG. 2

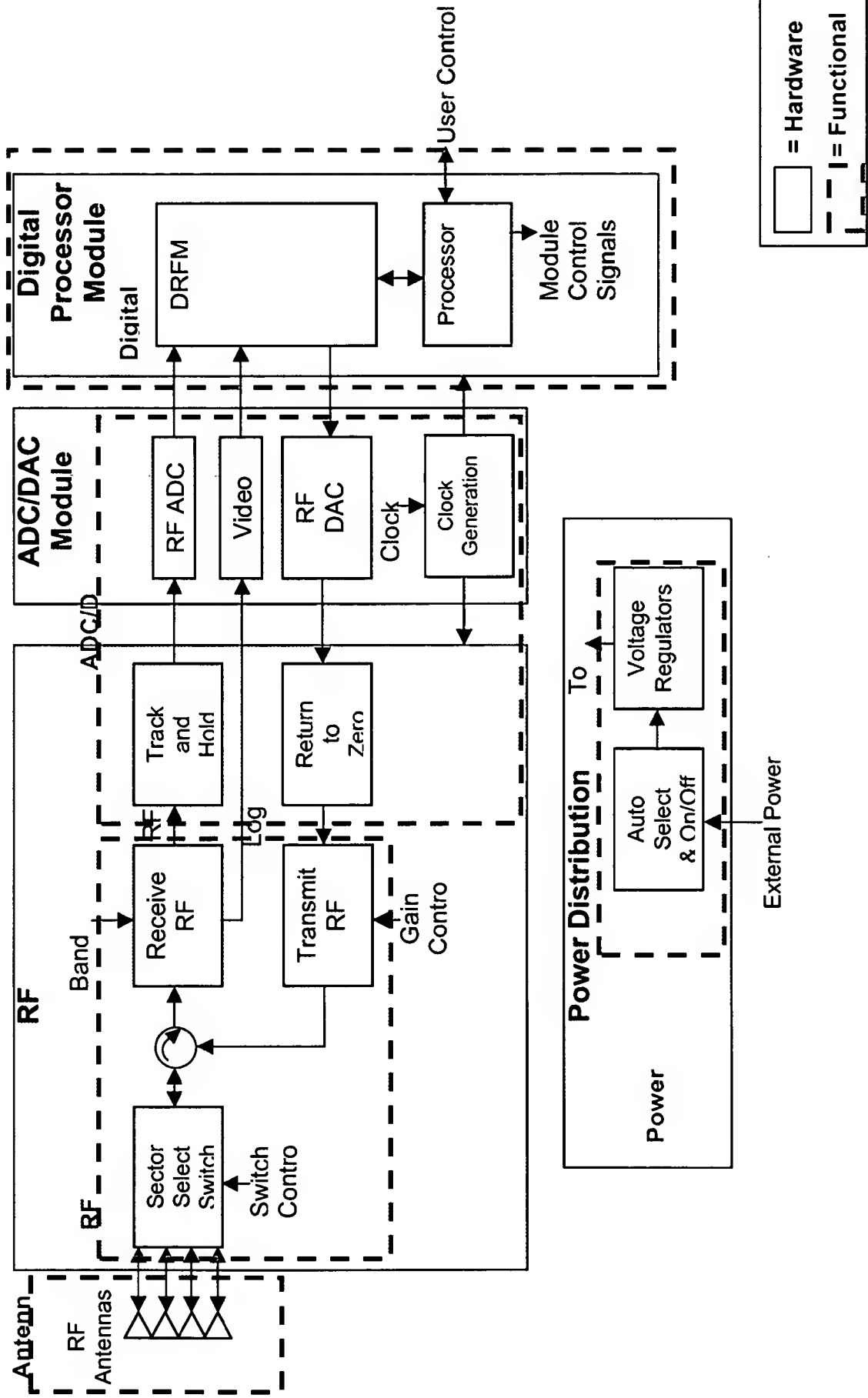


FIG. 3